STARS ACADEMY LAHORE

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Roll No. of Candidate _____ Name of Candidate _____

STARS ENTRY TEST SYSTEM-2021
(MDCAT)

Test Code: B-4 (BIOENERGETICS) **Time Allowed: 50 min**

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BIOLOGY

1. **The utilization of light energy to drive the synthesis of ATP is called as:**
   A) Photolysis
   B) Photosynthesis
   C) Photophosphorylation
   D) Respiration

2. **Which of the following colors of light work best for photosynthesis?**
   A) Green and Blue
   B) Blue and Red
   C) Red and Green
   D) Green and Orange

3. **Consider the following statements:**
   1. Carbon dioxide, chlorophyll and sunlight all are essential for photosynthesis.
   2. Rate of photosynthesis is minimum in red light and maximum in green light.
   3. Increase in O2 concentration decreases photosynthesis.
   Which of the statements given above are correct about photosynthesis?
   A) 1 and 2
   C) 1 and 3
   C) 2 and 3
   D) 1, 2 and 3

4. **Read the following statements carefully:**
   1. Photolysis of water involves breakdown of oxygen by light.
   2. The specific function of light energy in the process of photosynthesis is to activate chlorophyll.
   3. Byproduct of photosynthesis is carbon dioxide.
   Which of the statements given above is/are correct?
   A) 1 only
   B) 3 only
   C) 2 only
   D) 1, 2 and 3

5. **What happens each day when the leaf of a plant is first exposed to light?**
   A) The epidermal cells on the upper surface of the leaf begin to photosynthesize
   B) Carbon dioxide diffuses out of the leaf
   C) The cells of the spongy mesophyll begin to take up carbon dioxide, and are the only cells that are able to do so.
   D) The guard cells become more turgid and the stomatal apertures open

6. **Bioenergetics is the study of_____.**
   A) Flow of energy among the organisms
   B) Processes of transformation of energy
   C) Relationship of energy forms
   D) All of these

7. **Energy transformation in living systems is attained with the help of_____.**
   A) Photosynthesis
   B) Krebs cycle
   C) Respiration
   D) Translocation

8. **Both photosynthesis and respiration require:**
   A) Chloroplasts
   B) Mitochondria
   C) Sunlight
   D) Cytochromes

9. **The earliest photo synthesizers used which of the following as the source of hydrogen?**
   A) CO_2
   B) H_2O
   C) $C_6H_{12}O_6$
   D) H_2S

10. **The organization of photosynthetic pigments into clusters is_____.**
    A) Photosynthesis
    B) Cluster arrangement
    C) Photosynthetic clusters
    D) Photosystem

11. **Chlorophylls are soluble in_____.**
    A) Organic solvents
    B) Organic solutes
    C) Inorganic solvents
    D) Inorganic solutes

12. **Which-one is not an accessory photosynthetic pigment?**
    A) Chl b
    C) Carotene
    C) Xanthophyll
    D) Chl a

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13. **Which one is correct?**
I. Light reaction occurs in stroma
II. Light reaction occurs in grana and ATP+ NADPH2 are formed
III. In stroma dark reaction occurs
IV. Dark reaction is not directly light driven but is dependent on the products (ATP+ NADPH2) formed in light reaction
A) All are correct
B) II, III and IV are correct
C) All are incorrect
D) I, II and IV are correct

14. **Production of NADPH in a chloroplast takes place during_____.**
A) Dark reaction
B) Non-cyclic photophosphyrlation
C) Cyclic photophosphyrlation
D) Oxidative phosphorylation

15. **Photosynthesis and respiration have which of the following in common?**
A) In eukaryotes, both processes occur in specialized organelles
B) ATP synthesis in both processes relies on chemiosmotic mechanism
C) Both use electron transport
D) All of the above

16. **Which one of the following is false?**
A) H_2S, not H_20, is involved in photosynthesis of purple sulphur bacteria
B) Light and dark reactions are stopped in the absence of light
C) Calvin cycle occurs in the grana of chloroplast
D) ATP is produced during light reaction via chemiosmosis

17. **Chemiosmosis needs:**
A) A membrane
C) A proton pump
C) A proton gradient and ATPase
D) All of these

18. **Chemiosmosis:**
A) Depends on protein complexes in thylakoid membrane
B) Depends on a difference in H+ concentration between the thylakoid space and the stroma
C) Results in ATP formation
D) All of the above

19. **In aerobic cellular respiration, which generates more ATP?**
A) Substrate level phosphorylation
C) Chemiosmosis
C) Both generate the same amount of ATP
D) Neither generates ATP

20. **All the following compounds are members of the electron transport chain except:**
A) Ubiquinone
C) Carnitine
B) NAD
D) FAD

21. **Cytochromes are:**
A) Oxygen acceptors
C) ATP acceptors
B) Electron acceptors
D) Protein acceptors

22. **The number of ATP molecules consumed during cyclic phosphorylation are:**
A) One
C) Two
B) Four
D) 0

23. **Inside an active mitochondrion, most electrons follow which pathway?**
A) Glycolysis → NADH → Oxidative Phosphorylation → ATP → 0_2
B) Krebs' cycle → + $FADH_2$ → ETS → ATP
C) ETS → Krebs' cycle → ATP → 0_2
D) Krebs' cycle → NADH + H+ → Electron transport chain → O_2

24. **Dark reaction of photosynthesis is driven by _____and the product of most crucial step of dark reaction undergoes _____.**
A) Light, phosphorylation
C) Darkness, regeneration
B) Products of light reaction, reduction
D) Products of light reaction, carboxylation

25. **Light reaction or photochemical phase includes:**
A) Absorption of light, water splitting, 0_2 release
B) $C0_2$ fixation and glucose formation
C) ATP and NADPH2 formation
D) Both A) and C)

26. **Which of the following represents a correct ordering of the events that occur in the catabolism of glucose in absence of 0_2?**
A) Glycolysis; TCA cycle; oxidative phosphorylation
B) Glycolysis; oxidative phosphorylation; TCA cycle
C) Oxidative phosphorylation; TCA cycle; glycolysis
D) Glycolysis; fermentation

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27. **Read carefully and Match List-I with List-II and select the correct answer by using the codes given below:**

List-I
A. Dark reaction
B. Light reaction
C. Glycolysis
D. Kreb's cycle

List-II
1. Grana of chloroplast
2. Stroma of chloroplast
3. Cytoplasm
4. Mitochondrial matrix

Codes:

	A	B	C	D
A)	2	1	3	4
B)	3	4	2	1
C)	1	3	4	2
D)	4	2	1	3

28. **Glycolysis occurs in _____ and produces _____ which in the presence of 0_2 enters the____.**
A) Cytosol; pyruvate; mitochondrion
B) Cytosol; glucose; mitochondrion
C) Mitochondrion; pyruvate; chloroplast
D) Chloroplast; glucose; cytosol

29. **Which metabolic pathway is a common pathway to both anaerobic and aerobic metabolism?**
A) TCA cycle
B) Glycolysis
C) ETS
D) Kreb's cycle

30. **ATP is a:**
A) An energy currency
B) A nucleotide
C) Formed in both respiration and photosynthesis
D) All of these

31. **The net requirement of energy for the formation of six hexose molecules a plant is:**
A) 180 ATP, 72 NADPH
B) 90 ATP, 60 NAQPH
C) 108 ATP,72 NADPH
D) 72 ATP, 48 NADPH

32. **RuBisCO stands for**
A) Ribulose Phosphate Carboxylic Oxygenase
B) Ribulose Phosphate Carboxylase Oxygenase
C) Ribulose Bisphosphate Carboxylase Oxygenase
D) None of the above

33. **Read the following four statements, A, B, C and D and select the right option having both correct statements.**

STATEMENTS:
A) Z scheme of light reaction takes place in presence of PS I only.
B) Only PS I is functional in cyclic photophosphorylation.
C) Cyclic photophosphorylation results into synthesis of ATP and NADPH2
D) Stroma lamellae lack PS II as well as NADPH

Options:
A) B and D
B) B and C
C) A and B
D) C and D

34. **Light is form of energy called**
A) electromagnetic energy
B) Mechanical waves
C) radiations
D) both A and C

35. **Energy transformation in living systems is attained with help of_____.**
A) photosynthesis
B) Krebs cycle
C) respiration
D) translocation

36. **The synthesis of one molecule of glucose during Calvin cycle requires?**
A) 6 molecules of ATP and 12 molecules of NADPH2
B) 12 molecules each of ATP and NADPH2
C) 12 molecules of ATP and 18 molecules of NADPH2
D) 18 molecules of ATP and 12 molecules of NADPH2

37. **The carbon-assimilation reactions require ATP and NADPH in the ratio**
A) 3:2
B) 3:4
C) 2:3
D) 4:3

38. **Which of the following systems has an associated water splitting activity ?**
A) Photosystem
B) Photosystem II
C) Photosystem I
D) Photosystem III

39. **The ATP synthase head is projected towards_____.**
A) Matrix
B) Cytosol
C) Inter-membranal space
D) Nuclear envelope

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40. **The total number of ATP formed by the complete breakdown of glucose molecule:**
A) 34 C) 36
B) 38 D) 40

41. **How many net ATP are produced in a eukaryotic cell from a glucose molecule?**
A) 34 C) 36
B) 38 D) 40

42. **The purpose of infoldings at inner membrane of mitochondrion is:**
A) Increase in surface area
B) To attach ATP synthase at the crista
C) High rate of dark reaction
D) High rate of Kreb's cycle

43. **Which of the following statement(s) is (are) correct?**
(i) Pyruvate can be converted into ethanol and carbon dioxide by yeast
(ii) Fermentation takes place in aerobic bacteria
(iii) Fermentation takes place in mitochondria
(iv) Fermentation is a form of anaerobic respiration
A) (i) and (iii) C) (ii) and (iv)
B) (i) and (iv) D) (ii) and (iii)

44. **Glycolysis:**
A) Takes place in all living cells
B) Causes partial oxidation of glucose (one molecule) to form 2 molecules of pyruvic acid and 2 ATP as net gain
C) Uses 2 ATP at two steps
D) All of these

45. **A component of the respiratory chain in mitochondria is:**
A) Coenzyme Q C) Coenzyme A
B) Acetyl coenzyme D) Coenzyme containing thiamin

46. **In bacteria, the site for respiratory activity is found in:**
A) Episome C) Microsome
B) Ribosome D) Cell membrane

47. **The graph or plot that shows the relative use of light in photosynthesis is called as:**
A) Absorption spectrum C) Action spectrum
B) Usage spectrum D) Relative spectrum

48. **Pyruvate is a three carbon compounds and that the fate of these carbon during complete breakdown is**
A) Stored in the body C) Used in photosynthesis
B) Released as CO_2 D) Used in Electron Transport Chain

49. **Respiration is a_____**
A) Anabolic+ Exergonic C) Catabolic + Endergonic
B) Catabolic + Exergonic D) Anabolic+ Endergonic

50. **Oxygen is used in which phase of aerobic respiration**
A) Glycolysis C) Pyruvic acid oxidation
B) Respiratory chain D) Krebs cycle

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SUBJECT

1	A	B	●	D	21	A	●	C	D	41	A	B	●	D
2	A	●	C	D	22	A	B	C	●	42	●	B	C	D
3	A	B	●	D	23	A	B	C	●	43	A	●	C	D
4	A	B	●	D	24	A	●	C	D	44	A	B	C	●
5	A	B	C	●	25	A	B	C	●	45	●	B	C	D
6	A	B	C	●	26	A	B	C	●	46	A	B	C	●
7	●	B	C	D	27	●	B	C	D	47	⊗	B	●	D
8	A	B	C	●	28	●	B	C	D	48	A	●	C	D
9	A	B	C	●	29	A	●	C	D	49	A	●	C	D
10	A	B	C	●	30	A	B	C	●	50	A	●	C	D
11	●	B	⊗	D	31	A	B	●	D	51	A	B	C	D
12	A	B	C	●	32	A	B	●	D	52	A	B	C	D
13	A	●	C	D	33	●	B	C	D	53	A	B	C	D
14	A	●	C	D	34	A	B	C	●	54	A	B	C	D
15	A	B	C	●	35	●	B	C	D	55	A	B	C	D
16	A	B	●	D	36	A	B	C	●	56	A	B	C	D
17	A	B	C	●	37	●	B	C	D	57	A	B	C	D
18	A	B	C	●	38	A	●	C	D	58	A	B	C	D
19	A	B	●	D	39	●	B	C	D	59	A	B	C	D
20	A	B	●	D	40	A	B	C	●	60	A	B	C	D

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